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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/068,025	02/08/2002	Kunio Kishimoto	43890-560	8924

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Washington, DC 20005-3096

EXAMINER

HARAN, JOHN T

ART UNIT	PAPER NUMBER
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1733

DATE MAILED: 04/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/068,025

Applicant(s)

KISHIMOTO ET AL.

Examiner

John T. Haran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 15-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 26-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/8/02, 2/20/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-14 and 26-35 in the response filed on 2/20/04 is acknowledged.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on 2/8/02 and 2/20/04 have been considered by the examiner.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 6/8/00. It is noted, however, that applicant has not filed a certified copy of the Japanese application as required by 35 U.S.C. 119(b). It is noted that filing of a certified copy for the PCT application is not sufficient in US cases that are a continuation of a PCT application.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-14 rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for drying board material when making a printed circuit board using the claimed method, does not reasonably provide enablement for broadly drying every type of material. The specification does not enable any person

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skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

The specification as originally filed is solely directed to a process for manufacturing a printed circuit board wherein the board material is dried using the claimed method for drying. There is no indication that the drying method is intended to be used for any sort of material other than board material for use in making a printed circuit board. There is no mention of drying board material used in making a printed circuit being a preferred use of the drying method, thereby implying other materials can be dried using the method. The circuit board material is the sole material disclosed for being dried using the drying method. There is no indication that the drying method can be used on every sort of imaginable material as the broadly worded claims 1-14 indicate. The specification is limited in scope to drying board material for use in making a printed circuit board and does not enable one skilled in the art to nor does it suggest to one skilled in the art to perform the drying method on any other type of material. The invention disclosed in the specification is not commensurate in scope with the broad claims of a method for drying every type of imaginable material.

It is suggested to cancel claim 1 and make claims 2-14 dependent on claim 26 or to amend claim 1 to indicate that the material being dried is a circuit board or circuit board material.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 is indefinite because it requires the air pressure of the hot air supplying step to be lower than the air pressure in the previous evacuating step, but for this to occur in a subsequent evacuating step. How can the air pressure of the hot air supply be lower during a subsequent evacuation step? It would appear to be consistent with the specification and claim 2, if the claim was amended to indicating that the air pressure of a subsequent evacuating step is lower than the air pressure of the previous evacuating step.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by JP U 61-55372.

JP U 61-55372 teaches a vacuum drying process for circuit board material wherein the circuit board material is placed in a vacuum chamber at atmospheric pressure, which is subsequently evacuated to a predefined pressure and after a specified time air is supplied into the vacuum chamber to bring it back to atmospheric

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pressure (information obtained from oral translation from PTO translator). JP U 61-55372 anticipates claim 1.

Regarding claim 9, the translation of claim 1 provided by applicant indicates the vacuum chamber has a plurality of air suction ports.

10. Claims 1, 5, 8, 10, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Chapman et al (U.S. Patent 5,732,478).

Chapman et al discloses a method for drying integrated circuit boards wherein the boards are placed in a vacuum chamber, warm dry heated air at ambient pressure is blown into the chamber to heat the boards, the vacuum chamber is evacuated to a predetermined pressure and the heating (air supplying) and evacuating steps are applied in alternating cycles (Column 2, lines 7-62). Chapman et al anticipates claims 1, 5, and 10.

Regarding claim 8, Chapman et al teaches supplying the air from a plurality of points (See Figure 2).

Regarding claim 13, Chapman et al teaches radiant heaters for heating the air to heat the boards (Column 4, lines 37-39).

11. Claims 1, 5, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Moldrup (U.S. Patent 4,893,415).

Moldrup discloses a method for drying wood using a discontinuous vacuum process wherein wood is placed in a vacuum chamber wherein heated air is circulated

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in the vacuum chamber to heat the wood, the vacuum chamber is evacuated to a predetermined pressure and the heating (air supplying) and evacuating steps are repeated (Column 2, lines 9-31). Moldrup anticipates claim 1, 5, and 13.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 3-4, 7-12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapman et al (U.S. Patent 5,732,478) or Moldrup (U.S. Patent 4,893,415).

Chapman et al and Moldrup are relied upon for the teachings noted above.

Regarding claims 3-4, Chapman et al and Moldrup are both silent towards whether the hot air is continued to be supplied into the chamber during part of the evacuation step. However, both teach the need to have the hot air circulate around the vacuum chamber (See Chapman Column 3, lines 9-11 and Moldrup Column 2, lines 12-14) and one skilled in the art would have readily appreciated that starting the evacuating step during the hot air supplying step would facilitate the circulation of the air. It would have been obvious to one of ordinary skill in the art at the time the invention was made to continue the hot air supply during a predetermined time of at least one second during

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the evacuation step in order to facilitate the circulation of the heated air to heat the material in the methods of Chapman et al and Moldrup.

Regarding claim 7, both teach the heated air being at least 35 degrees Celsius (Chapman Column 3, lines 50-54; Moldrup Column 2, line 5).

Regarding claims 8 and 9, it is well known and conventional to have a plurality of vacuum suction ports and air supply ports in a vacuum chamber in order to maximize efficiency and reduce process time. It would have been obvious to have a plurality of both air supply ports and vacuum suction ports in the methods of Chapman and Moldrup.

Regarding claims 10 and 11, one skilled in the art would have readily appreciated that the heated air is intended to absorb the moisture in the material and such a process is much efficient if the air has been cleaned and dehumidified beforehand to allow for maximum moisture absorption. It would have been obvious to dehumidify and clean the air in the methods of Chapman and Moldrup in order to increase moisture absorption in the hot air.

Regarding claim 12, one skilled in the art would have readily appreciated that the predefined pressure of the evacuating step would depend upon a variety of factors such as the material worked upon, the volume of the chamber, etc. It would have been within the mechanical skill of the ordinary skilled artisan to determine the necessary pressure in order to achieve the desired moisture removal in the methods of Chapman et al and Moldrup.

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Regarding claim 14, Moldrup teaches heating the air and material using dielectric heating (Column 2, lines 9-19) but is silent towards using microwaves, however such is well known and conventional source of dielectric heating and it would have been obvious to use conventional means of heating, such as dielectric heating with microwaves in the methods of Chapman et al and Moldrup.

14. Claims 26-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of JP U 61-55372 or Chapman et al (U.S. Patent 5,732,478).

Regarding claims 26-28, the various claimed steps in the method of manufacturing a circuit board, with the exception of the particular claimed method of drying, are notoriously well known and conventional steps to take in forming a printed circuit board, as shown for example in the admitted prior art (See specification, pages 1-2). It is noted that claims 26-28 appear to be set up in a Jepson claim format, however they do not have the phrase "the improvement comprising" before "said method of drying comprising". If the claims are intended to be Jepson claims this phrase should be inserted.

JP U 61-55372 teaches a vacuum drying process for circuit board material wherein the circuit board material is placed in a vacuum chamber at atmospheric pressure, which is subsequently evacuated to a predefined pressure and after a specified time air is supplied into the vacuum chamber to bring it back to atmospheric pressure (information obtained from oral translation from PTO translator).

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Chapman et al discloses a method for drying integrated circuit boards wherein the boards are placed in a vacuum chamber, warm dry heated air at ambient pressure is blown into the chamber to heat the boards, the vacuum chamber is evacuated to a predetermined pressure and the heating (air supplying) and evacuating steps are applied in alternating cycles (Column 2, lines 7-62).

One skilled in the art would have readily appreciated that the admitted prior art taught vacuum drying the circuit board material but was silent to the procedure (Specification, page 2, line 24) and that it would be obvious to use a known vacuum drying procedure to accomplish drying of the circuit board material, such as the one taught in JP U 61-55372 or Chapman et al. It would have been obvious to one of ordinary skill in the art at the time the invention was made to dry the circuit board material by placing it in a vacuum chamber, evacuating the chamber, and then supplying air to the chamber to bring it back to atmospheric pressure in the notoriously well known and conventional method of making printed circuit boards, as evidenced by the admitted prior art, as suggested in JP U 61-55372 or Chapman et al.

The limitations of claims 29-35 are notoriously well known and conventional materials and method steps for making circuit boards and it would have been obvious to use them in the method of making a printed circuit board.

Allowable Subject Matter

15. The following is a statement of reasons for the indication of allowable subject matter:

Although not presently claimed, the application contains allowable subject matter in that the prior art of record fails to disclose a method of making a circuit board wherein the circuit board material is dried using a drying method that the evacuating and supplying steps are performed a plurality of times and the predefined pressure of the evacuating step is decreased each time.

JP U 61-55372 teaches drying printed circuit boards using an evacuating step and an air supplying step but does not appear to teach perform the steps multiple times.

Chapman et al discloses a method for drying integrated circuit boards wherein the boards are placed in a vacuum chamber, warm dry heated air at ambient pressure is blown into the chamber to heat the boards, the vacuum chamber is evacuated to a predetermined pressure and the heating (air supplying) and evacuating steps are applied in alternating cycles (Column 2, lines 7-62). There is no suggestion that the pressure of each subsequent evacuation step is decreased.

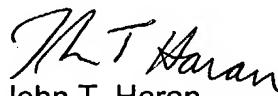
Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John T. Haran** whose telephone number is **(571) 272-1217**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


John T. Haran
Examiner
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